


magnified copy of the original figure 8 is presented for approval. It is intended the new figure 8 will replace the original figure 8, occupying the lower half of sheet 12.

Claims:

Please cancel all claims of record, including the claims of Preliminary Amendment B, (claims 1 through 29), and substitute new claims 30-42, as follows:


30. A pedal having:

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- (a) a spindle for attachment to a crankarm, said spindle having an axis of rotation,
 - (b) at least one means for supporting a rider's shoe on its sole, each said shoe supporting means having at least a first shoe supporting surface located above said spindle, facing a rider's shoe, said first shoe supporting surface being configured to at least partially surround a corresponding:
 - (c) first clipless shoe binding, located above said spindle, also facing said shoe, said first clipless shoe binding being from the group of shoe bindings comprising a mechanism which attaches to a cleat mounted to and recessed within the sole of said shoe, said recess having a depth in a vertical direction,
 - (d) a second shoe supporting surface on either said first shoe supporting means, or on a second said shoe supporting means, located below said spindle, facing the ground, said second shoe supporting surface optionally being configured to at least partially surround an optional corresponding:
 - (e) second clipless shoe binding located below said spindle, also facing said ground, said second clipless shoe binding also being from the group of shoe bindings comprising a mechanism which attaches to a cleat mounted to and recessed within said shoe sole,
 - (f) each said shoe supporting surface having a height defined as the distance from said spindle axis to a first cylinder, said cylinder fully impressed against said shoe supporting surface, said cylinder having a first axis parallel to said spindle

axis, said cylinder having a radius of 8 inches,

- (g) each said binding having an uppermost surface or plurality of surfaces, each said binding having a height defined as the distance from said spindle axis to a second cylinder tangent to said uppermost surface or plurality of surfaces of said binding, said second cylinder having a radius of 8 inches, said second cylinder having a second axis parallel to said first cylinder axis, said second axis lying in the plane defined by said spindle axis and said first cylinder axis,
- (h) means for rotatably connecting all said shoe supporting means to said spindle,
- (i) means for rotatably connecting all said clipless shoe bindings to said spindle, wherein the improvement comprises the addition of:
- (j) a relative height variability means for varying and securely holding the difference in said heights of said bindings relative to said corresponding shoe supporting surfaces to either position and securely hold said heights of said clipless shoe bindings to be at least sufficiently level with or lower than said height of said corresponding shoe supporting surfaces to allow at least said shoe supporting surfaces to securely support said shoe sole without attachment of said sole recessed cleat with either of said clipless shoe bindings, without regard to the position of shoe placement upon either of said shoe supporting surfaces, hereby referred to as an unbound mode of operation, or to position and securely hold said height of said clipless shoe bindings sufficiently higher than said height of said corresponding shoe supporting surfaces, by a distance generally equal to or greater than said recess depth, thusly allowing said sole recessed cleat to attach to said clipless shoe bindings, hereby referred to as a clipless binding mode of operation.

31. The pedal of claim 30, wherein said relative height variability means is configured to change the relative height between all said bindings and all said corresponding shoe supporting means simultaneously, upon a single actuation of said relative height variability means by said rider.


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32. The pedal of claim 30, wherein said relative height variability means provides for varying and holding fast said heights of said clipless shoe bindings to be either sufficiently higher than said heights of said corresponding shoe supporting surfaces to allow said pedal to be used in said clipless binding mode, or to be at least sufficiently level with said heights of said corresponding shoe supporting surfaces, to allow said pedal to be used in said unbound mode on both said sides of said pedal, said heights of said shoe supporting surfaces being fixed.
33. The pedal of claim 30, having additionally, a rider actuatable means for varying the difference in said heights of said clipless shoe bindings relative to said heights of said corresponding shoe supporting surfaces to be substantially zero, to allow usage of said pedal in said unbound mode on both said sides of said pedal, immediately upon release of said cleat from the said clipless shoe binding to which said cleat was engaged.
34. The pedal of claim 30, wherein at least one said shoe supporting surface comprises a plurality of surfaces to form a single shoe supporting surface.
35. The pedal of claim 30 wherein at least part of said clipless shoe bindings are continuous with at least part of said relative height variability means.
36. The pedal of claim 30 wherein said relative height variability means is dimensioned to provide sufficient difference in said heights of said clipless bindings relative to said corresponding shoe supporting surfaces to allow said pedal to be operated in said unbound mode without contact of said sole recessed cleat on said pedal.
37. The pedal of claim 30 wherein said relative height variability means is

dimensioned to provide sufficient difference in said heights of said clipless bindings relative to said corresponding shoe supporting surfaces to allow said pedal to be operated in said clipless binding mode without contact of said sole on said pedal.

38. A pedal for use with a rider's shoe having an attached cleat recessed within the sole of said shoe, comprising:

- a) a spindle, for attachment to a crankarm, said spindle having an axis of rotation,
- b) a body, rotatably attached to said spindle, said body having a first shoe supporting surface, and a second shoe supporting surface disposed oppositely from said first shoe supporting surface, each said shoe supporting surface being generally parallel to said spindle axis and having a height above said spindle axis at the general location of shoe sole contact in a normal pedaling foot position whereby the ball of the rider's foot is placed substantially over said spindle axis, and whereby the pressure of the rider's foot is evenly distributed transversely across said shoe supporting surface,
- c) a first binding, arranged generally in the shoe sole receiving position of said first shoe supporting surface, and a second binding disposed oppositely from said first binding, each said binding being from the group of clipless shoe binding mechanisms designed to attach to a cleat mounted to, and recessed within the sole of said shoe, each said binding having an uppermost shoe-facing surface or plurality of surfaces, each said binding having a general height of said uppermost shoe-facing surface or plurality of surfaces from said spindle axis,
- d) a support linkage for attaching said bindings to said body in a height variable configuration comprising:
- e) a cavity for containing said bindings and said support linkage, generally centrally disposed in said body, said cavity perforating both said shoe supporting surfaces, said cavity having a vertical longitudinal plane in the direction of travel, passing

through the center of said cavity, said cavity having an outward transverse side, located on the side of said longitudinal plane opposite said crankarm, and an inward transverse side, located on the side of said longitudinal plane closest to said crankarm, said cavity having at least a first pocket formed in said outward side, adjacent to said first binding,

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- f) a first pivot pin, having a pivot axis parallel to said spindle axis and located generally forward, in the direction of travel, of said spindle axis, fixedly mounted, on its ends, in said outward and inward sides of said cavity, thusly spanning the transverse width of said cavity,
 - g) a second pivot pin, having a pivot axis parallel to said spindle axis, located generally rearward, in the direction of travel, of said spindle axis, and fixedly mounted, on its ends, in said inward and outward sides of said cavity, thusly spanning the transverse width of said cavity,
 - h) a first outward link, rotatably supported at its midpoint on said first pivot pin, and arranged contiguous to said outward side of said cavity,
 - i) a first inward link, rotatably supported at its midpoint on said first pivot pin, and arranged contiguous to said inward side of said cavity,
 - j) a second outward link, rotatably supported at its midpoint on said second pivot pin, and arranged contiguous to said outward side of said cavity,
 - k) a second inward link, rotatably supported at its midpoint on said second pivot pin, and arranged contiguous to said inward side of said cavity,
 - l) said first outward link and said first inward link rotatably supporting, at a first distal end of each said link,
 - m) a first mounting pin, said first pin having an axis of rotation generally parallel to said spindle axis,
 - n) said first outward link and said first inward link rotatably supporting, at a second distal end of each link,
 - o) a second mounting pin, said second mounting pin having an axis of rotation generally parallel to said spindle axis,

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- p) said second outward link and said second inward link rotatably supporting, at a first distal end of each said link on the same side of a central horizontal plane through said spindle axis as said first distal ends of said first inward and outward links,
 - q) a third mounting pin, said third mounting pin having an axis of rotation generally parallel to said spindle axis,
 - r) said second outward link and said second inward link rotatably supporting, at a second distal end of each link,
 - s) a fourth mounting pin, said fourth mounting pin having an axis of rotation generally parallel to said spindle axis,
 - t) a first binding base, said first base providing for mounting of said cleat engaging mechanism of said first binding, said first base fixedly attached to said first and third mounting pins between all said inward and said outward links, said first binding base substantially spanning the transverse distance between all said inward and outward links,
 - u) a second binding base, said second binding base providing for mounting of said cleat engaging mechanism, said second binding base fixedly attached to said second and fourth mounting pins between all said inward and said outward links, the transverse width of said base substantially spanning the distance between all said inward and outward links, said support linkage thusly connecting said bindings to said body on an articule parallelogram support linkage, with said support linkage restrained from sliding lateral motion on said first and second pivot pins by said inward and outward cavity sides, thusly allowing said bindings to have a substantially variable height relative to said corresponding shoe supporting surfaces, said support linkage thusly having a binding extended position, where said bindings are extended maximally outward from said cavity, and a binding retracted position wherein said bindings are retracted into said cavity,
 - v) at least one latch for releasably securing said support linkage against articulation

in said binding extended position, each said latch comprising a member articulably mounted in a said pocket of said cavity, each said member formed and arranged to engage and affix, with respect to said body, at least one articulating component of said linkage, when said support linkage is in said binding extended position,

- w) at least one biasing means for urging each said latch to engage and affix said articuable component or plurality of components, thusly providing for securing both said first and second bindings in said binding extended position whereby said cleat may be engaged with either of said bindings and motive pedalling force applied, to provide clipless binding operation,
- x) at least one latch releasing means for articulating all said latches away from all said latch engaged articuable components of said support linkage upon actuation by said rider, thusly providing for disengaging all said latches from said support linkage and allowing said support linkage to move said bindings away from said binding extended position,
- y) said cavity being of sufficient volume and extent to allow said support linkage, with said bindings attached, to articulate away from said binding extended position sufficiently to retract said bindings into said cavity sufficiently to allow said shoe supporting surface to firmly, safely, and comfortably support said shoe in a normal foot position without engagement of said cleat with either of said bindings,
- z) at least one biasing means acting upon at least one of said articuable components of said support linkage to provide for articulating said support linkage away from said binding extended position, thereby providing for retracting said bindings sufficiently into said cavity upon release of all said latches from said latch engaged articuable components, to allow said shoe supporting surfaces to firmly, safely, and comfortably support a shoe on its outsole, in a normal pedalling foot position without said cleat attaching to either of said bindings to provide unbound pedalling operation,

- aa) at least one stop for contacting at least one surface of said support linkage or said binding to prevent further parallelogram articulation of said support linkage beyond said binding retracted position,
- ab) all said latches being additionally formed and arranged to allow articulation of said support linkage from said binding retracted position to said binding extended position without undue mechanical or frictional resistance of said latch on any part of said support linkage or bindings, and to provide re-engagement of all said latches to said latch engageable components upon a rider actuated articulation of said support linkage from said binding retracted to said binding extended position.

CS 39. The pedal of claim 38 having additionally, a locking mechanism for preventing articulation of said support linkage away from said binding extended position upon actuation by said rider, when either said binding is engaged with said cleat, comprising:

- a) said first pocket being additionally formed adjacent to said first outward link and said first binding,
- b) a second pocket formed in said outward side of said cavity, adjacent to said second outward link and said second binding,
- c) said first latch formed and arranged to engage and affix to said first link when said support linkage is in said binding extended position,
- d) a second said latch, said latch articulably mounted in a said second pocket, and formed and arranged to engage and affix to said second link when said support linkage is in said binding extended position,
- e) each said binding base having an aperture located generally central in said binding base,
- f) each said binding base having a lock spring for locking at least one said latch against release of support linkage when said cleat is engaged with said binding, comprising a cantilever leaf spring type member having a fixed end mounted to

the underside of said base of each said binding, each said lock spring having a free end, each said free end substantially spanning said transverse width of said cavity and having at least one transverse edge, at least one said transverse edge having a stop, each said stop located in a transverse position over the gap between a said latch, in its link engaged position, and said latch's corresponding said pocket, said free end of each said lock spring having a central distal tab protruding through said aperture in said binding base and extending upward into the space occupied by said cleat when engaged with said binding, whereby said cleat, when engaged with said binding, will depress said central distal tab, deflecting said free end of said leaf spring downward, thereby inserting all said stops on said lock spring between all said corresponding latches and said corresponding pockets, preventing said articulation action of said latches away from said latch engaged links, preventing said release of said latches from said links, and thusly preventing said articulation of said support linkage away from said binding extended position,

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- g) a presetable latch release mechanism, for providing the release of all said latches from said links immediately upon disengagement of said cleat from either said binding, without any otherwise actuation by a rider, comprising:
 - h) a first latch actuating arm, affixed to said first latch, and a second latch actuating arm affixed to said second latch, said first and second latch actuating arms each having a clevis on their free ends, said first and second latch actuating arms being formed of a suitable material in a suitable thickness to be elastically deformable in the manner of a leaf spring,
 - i) a first toggle plate having a first clevis for forming a hinged connection with said clevis of said first latch actuating arm, and being rotatably connected with said first latch actuating arm at said clevises with a first clevis pin fixedly mounted in one of said connected clevises, and a second toggle plate having a first clevis for forming a hinged connection with said second latch actuating arm and being rotatably connected with said second latch actuating arm at said clevises with a

- second clevis pin fixedly mounted in one of said connected clevises,
- j) said first toggle plate having a second clevis, parallel to said first clevis, formed on an opposing edge from said first clevis, and said second toggle plate having a second clevis parallel to said first clevis of said second toggle plate formed on an opposing edge from said first clevis of said second toggle plate for forming a hinged connection with said second clevis of said first toggle plate,
 - k) said first and second toggle plates being rotatably connected at said second clevises with a third pin, fixedly mounted in one of said second clevises, thusly forming a butterfly toggle mechanism which acts to spread apart said first and second latch actuating arms, simultaneously releasing said first and said second latches from said latch engaged components of said support linkage, upon application by said rider of a force on said butterfly toggle mechanism, directed generally at and along said spindle axis,
 - l) a first toggle stop, formed or mounted in said body for limiting longitudinal motion of said first clevis of said first toggle plate, and a second toggle stop formed or mounted in said body for limiting longitudinal motion of said first clevis of said second toggle plate,
 - m) said first toggle plate having a plane defined by the axes of rotation of said first and said second clevises of said first toggle plate,
 - n) said second toggle plate having a plane defined by the axes of rotation of said first and said second clevises of said second toggle plate, said planes intersecting at an angle of less than 180 degrees, as measured between the sides of said toggle plates facing said longitudinal plane, when said butterfly toggle mechanism is in an unactuated state,
 - o) said first and second toggle stops having a distance between them generally slightly less than the distance between said first clevises of said first and said second toggle plates when said planes of said toggle plates have an angle of 180 degrees between them, thusly centering said butterfly toggle latch releasing mechanism about said spindle axis upon actuation, thusly providing for the

generally simultaneous release of said first and second latches from said first and second latch engaged components, respectively, in the event a non-axial force is inadvertently applied by said rider along with said axial force when depressing said hinge connected said toggle plates,

- p) a third stop for limiting the articulation of said toggle plates to a position where the angle between said planes of said toggle plates is generally slightly greater than 180 degrees, located in a contacting position with said hinge connecting said first and second toggle plates, whereby said rider may depress said butterfly toggle mechanism fully to said third stop, while said cleat is engaged with a said binding, elastically deforming at least one said latch actuating arm, thusly providing for retention of said butterfly toggle type mechanism in a metastable latch releasing position, with at least one said latch being prevented from releasing by the action of said binding engaged cleat upon said lock plate, thusly providing for the release of all said locked latches only and immediately upon release of said cleat from said binding,
- q) a mechanism for returning said first and second toggle plates to a position whereby said angle between said planes of said toggle plates is less than 180 degrees, comprising a pushpin slidably mounted in a bore of said body, said pushpin having a conical end for slidably contacting an edge of said link, and an opposing end for contacting and exerting an outward force on one of said toggle plates, whereby the pivoting motion of said link acts upon said conical end to slide said pushpin in said bore towards said toggle plate, thusly returning said butterfly toggle mechanism from said metastable position to a stable position whereby the angle between said planes of said toggle plates is less than 180 degrees.

40. The pedal of claim 38 having additional said latches acting in unison, comprising:

- a) said cavity having two said pockets formed in said outward side of said cavity,

- and two said pockets formed in said inward side of said cavity,
- b) a said latch articulably mounted in each said outward pocket, hereby referred to as outward latches,
 - c) a said latch articulably mounted in each said inward pocket, hereby referred to as inward latches, thusly providing multiple and evenly distributed affixation means for securing said support linkage in a binding extended position,
 - d) all said outward latches having additionally an actuating arm extending partially across said cavity towards said inward latches,
 - e) all said inward latches having additionally an actuatable arm extending partially across said cavity towards said outward latches and formed to be actuatable by said actuating arm of said outward latch, thusly providing for the simultaneous release of all said latches from said latch engaged components of said support linkage upon a single depression of said toggle plate assembly by said rider.

41. The pedal of claim 39 having additional said latches acting in unison, comprising:

- a) said cavity having two said pockets formed in said outward side of said cavity, and two said pockets formed in said inward side of said cavity,
- b) a said latch articulably mounted in each said outward pocket, hereby referred to as outward latches,
- c) a said latch articulably mounted in each said inward pocket, hereby referred to as inward latches, thusly providing multiple and evenly distributed affixation means for securing said support linkage in a binding extended position,
- d) all said outward latches having additionally an actuating arm extending partially across said cavity towards said inward latches,
- e) all said inward latches having additionally an actuatable arm extending partially across said cavity towards said outward latches and formed to be actuatable by said actuating arm of said outward latch, thusly providing for the simultaneous release of all said latches from said latch engaged components of said support